AMENDMENTS TO CLAIMS

1. (Original) A method to identify text-like pixels from an image, the method comprising:
   (a) providing an image; and
   (b) classifying line segments of pixels within the image by edge-bounded averaging, the edge-bounded averaging including finding an average value of connected pixels within a mask centered at location (i,j).

2. (Original) The method of claim 1, further comprising:
   (c) examining sub-blobs of pixels within the image; and
   (d) performing sub-blob connectivity analysis.

3. (Original) The method of claim 2, further comprising:
   (e) identifying and classifying edges of pixels within the image;
   (f) performing filling to further classify pixels within the image;
   (g) performing consistency analysis of pixels within the image;
   (h) performing pixel connectivity analysis of pixels within the image; and
   (i) identifying text pixels within the image.

4. (Currently amended) The method of claim 1, wherein ~~the image is a digital image~~ the connected pixels within the mask are of the same type of edges or non-edges.

5. (Original) The method of claim 1, further comprising performing color space conversion of the image.

6. (Original) The method of claim 1, further comprising smoothing the image.

7. (Original) The method of claim 1, wherein a Gaussian lowpass filter is applied to the image, the filter being

$$f_{i,j} = ke^{-\alpha^2\left[(i-c)^2+(j-c)^2\right]/c^2}$$

where k is a normalizing factor such that $\sum_{i,j} f_{i,j} = 1.0$, c is the center of the filter and $\alpha = 1.0$.

8. (Original) The method of claim 3, step (e) identifying and classifying edges of pixels within the image, wherein every pixel is classified as NON EDGE, WHITE EDGE or BLACK EDGE.

9. (Previously presented)The method of claim 8, wherein step (e) identifying and classifying edges of pixels within the image comprises:

(1) calculating a vertical gradient $G^I_{i,j}$, a horizontal gradient $G^J_{i,j}$ and the magnitude of gradient $M_{i,j}$ using the formula,

$$G^I_{i,j} = \left(y_{i+1,j-1} + 2y_{i+1,j} + y_{i-1,j+1}\right) - \left(y_{i-1,j-1} + 2y_{i-1,j} + y_{i-1,j+1}\right)$$
$$G^J_{i,j} = \left(y_{i+1,j-1} + 2y_{i,j+1} + y_{i-1,j+1}\right) - \left(y_{i+1,j-1} + 2y_{i,j-1} + y_{i-1,j-1}\right)$$
$$M_{i,j} = \sqrt{\left(G^I_{i,j}\right)^2 + \left(G^J_{i,j}\right)^2}$$

Where $y_{i,j}$ is a pixel luminance value at an index i,j

(2) calculating a discrete Laplacian (a second directive):

$$L_{i,j} = \left(y_{i-2,j} + y_{i+2,j} + y_{i,j-2} + y_{i,j+2}\right) - 4y_{i,j}$$

(3) classifying every pixel as the following:

If $M_{i,j} > T_e$ then

If $L_{i,j} < 0$

Classify pixel at (i,j) as WHITE EDGE

Else

Classify pixel at (i,j) as BLACK EDGE

Endif

Else

Classify pixel at (i,j) as NON EDGE

Endif.

10. (Original) The method of claim 1, wherein step (b) classifying line segments of pixels within the image by edge-bounded averaging comprises:
starting from a first side of a line proceeding to a second side of the line identifying consecutive segments of pixels as NON EDGE, WHITE EDGE or BLACK EDGE.

11. (Original) The method of claim 1, wherein step (b) classifying line segments of pixels within the image by edge-bounded averaging comprises:
computing the edge-bounded averaging for at least eight locations including both end points of a central interior, both end points of a left edge segment, both end points of a right edge segment, a right end point of a left interior and a left end point of a right interior.

12. (Original) The method of claim 11, further comprising:
classifying the central interior as NON TEXT, BLACK INTERIOR or WHITE INTERIOR based upon the edge-bounded averaging values.

13. (Original) The method of claim 3, wherein step (f) performing filling to further classify pixels within the image comprises:

classifying segments as NON TEXT; and

examining segments classified as NON TEXT to determine whether they may be reclassified as BLACK INTERIOR, BLACK EDGE, WHITE INTERIOR or WHITE EDGE.

14. (Original) The method of claim 3, wherein step (g) performing vertical consistency analysis of pixels within the image comprises:

examining pixels not yet classified as NON TEXT to determine whether they are BLACK INTERIOR, BLACK EDGE, WHITE INTERIOR or WHITE EDGE.

15. (Original) The method of claim 3, wherein step (h) performing pixel connectivity analysis of pixels within the image comprises:

identifying aggregates of pixels having been identified as candidates for text, the aggregates being sub-blobs; and

collecting statistics with respect to each sub-blob, wherein said statistics are selected from the group consisting of total number of pixels, sums of color values, number of border pixels, number of broken border pixels and horizontal run length.

16. (Original) The method of claim 2, wherein step (c) examining sub-blobs of pixels within the image comprises:

examining each sub-blob to determine whether it is NON TEXT.

17. (Original) The method of claim 3, wherein step (i) identifying text pixels comprises:

examining each sub-blob to classify each pixel as either a text pixel or a non-text pixel.

18. (Cancelled)

19. (Cancelled)

20. (Currently amended) The method of claim 26, further comprising ~~18, wherein step (e)~~ performing pixel connectivity analysis of pixels within the image, including ~~comprises:~~

identifying aggregates of pixels having been identified as candidates for text, the aggregates being sub-blobs;

collecting each sub-blobs statistics: total number of pixels, sums of color values, number of border pixels, number of broken border pixels and horizontal run length; and

counting sums of each luminance and chroma.

21. (Cancelled)

22. (Currently amended) The method of claim 26, further comprising ~~18, wherein step (e)~~ performing pixel connectivity analysis of pixels within the image, including ~~comprises:~~

identifying aggregates of pixels having been identified as candidates for text, the aggregates being sub-blobs;

collecting each sub-blobs statistics: total number of pixels, sums of color values, number of border pixels, number of broken border pixels and horizontal run length; and

counting sums of each Y, C_r, C_b.

23. (Currently amended) A system for identifying text-like pixels from an image, the system comprising a processor for classifying ~~a CPU running software adapted to: (a) classify~~ line segments of pixels within the image by edge-bounded averaging, the edge-bounded averaging including finding an average value of connected pixels within a mask centered at location (i,j).

24. (Currently amended) The system of claim 23, wherein the processor also examines ~~software is further adapted to: (b) examine~~ sub-blobs of pixels within the image; and ~~(c) perform~~ performs sub-blob connectivity analysis.

25. (Currently amended) The system of claim 24, wherein the processor also identifies and classifies ~~software is further adapted to: (d) identify and classify~~ edges of pixels within the image; ~~(e) perform~~ performs vertical filling to further classify pixels within the image; ~~(f) perform~~ performs vertical consistency analysis of pixels within the image; ~~(g) perform~~ performs pixel connectivity analysis of pixels within the image; and ~~(h) identify~~ identifies text pixels.

26. (New) A method of processing a digital image, the method comprising:
identifying a segment of connected pixels in the image;
finding average values of connected pixels of the same type in a neighborhood of the segment; and
using the average values to classify the segment as text or non-text.

27. (New) Apparatus comprising a processor for performing the method of claim 26.

28. (New) An article comprising memory encoded with data for instructing a processor to perform the method of claim 26.